SUBCOMMITTEE ON NATIONAL SECURITY, EMERGING THREATS,
AND INTERNATIONAL RELATIONS
Christopher Shays, Connecticut
Chairman
Room B-372 Rayburn Building
Washington, D.C. 20515
Tel: 202 225-2548
Fax: 202 225-2382
E-mail: hr.groc@mail.house.gov

Statement of Rep. Christopher Shays
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What's the difference between an estimate and a guess?

When plotting the path of a chemical, biological or radiological plume, the difference between a reasonable approximation and an unwarranted assumption can mean life or death. For U.S. troops on foreign battlefields, and for civilians here at home, the science of dispersion modeling lies at the heart of current efforts to prepare for, respond to and recover from toxic attacks.

From the trenches of World War I through last month's TOPOFF2 exercise, military planners and homeland security officials have been attempting to refine the data and calculations needed to map the trajectory of noxious clouds. But the variability of modeling techniques, and the paucity of real-time data on weather patterns and weapon potency, still make projections too slow and limited to be relied upon for many critical decisions.

Past attempts to model plume courses and concentrations yield important lessons, and warnings.

In 1996, this Subcommittee heard persuasive testimony that Coalition bombing of Iraqi chemical weapons facilities during the first Gulf War launched plumes that traversed large portions of the combat theater. Analysis of infrared satellite imagery and available weather data suggested broad dispersion patterns that would account for chemical agent detections at the time – detections once discounted but later deemed "credible" by the Department of Defense (DOD).

But subsequent modeling of U.S. demolition of chemical weapons at Khamisiyah in Iraq, conducted by DOD and the Central Intelligence Agency (CIA) between 1996 and 2000, produced varied yet uniformly narrower zones of risk than seemed plausible. So we asked the General Accounting Office (GAO) to review the Khamisiyah plume models and report on the implications of that process for Gulf War veterans and for all those who might find themselves in the path of poisonous plumes at home or abroad.

The GAO findings highlight the dangers of reaching conclusions when critical data elements remain speculative or incomplete: DOD lacked essential information on the quantity and physical characteristics of the agents dispersed. Climate data was deficient. Arbitrary limits were placed on estimated plume altitudes, seriously skewing downrange projections. DOD combined several in-house systems, rather than select one validated modeling approach, in the apparent hope cumulative strengths would outweigh combined weaknesses. But at some point, even that attempt to err on the side of caution produced more error than caution.

Drawing cohorts based on flawed DOD modeling, epidemiological studies comparing "exposed" and "unexposed" veterans may be invalid. Once again, the benefit of any doubts about the extent of exposure risk has not gone to veterans, who now must bear the burden of proving themselves wrongly categorized by speculative Pentagon plume mapping.

The same dangers, and more, confront dispersion modeling applications to meet homeland security requirements. Numerous special-purpose models can produce very different outcomes using the same data. More vexing, very little data on wind and weather patterns has been captured in urban settings, the most inviting landscape for a terrorist attack.

In the Cold War, global and national security demanded the ability to plot the trajectory of ballistic missiles. In the war against weapons of mass destruction, we need to be able to predict the path of toxic clouds across new battlefields abroad and here at home. Today we examine efforts, past and present, to advance the science and perfect the art of plume modeling.

Our panel of witnesses brings impressive credentials and expertise to this discussion of a critical force protection and homeland security tool. We welcome them and look forward to their testimony.